

U.S.S.N. 10/605,688
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In the Claims

Please amend the claims as follows:

We claim:

1-6. (Cancelled).

7. (Currently Amended) A method for the catalytic partial oxidation of hydrocarbon fuel comprising:

feeding a feed gas mixture comprising an oxygen containing gas and a hydrocarbon fuel through a plurality of catalytic partial oxidation reactors disposed in a shell parallel to and spaced from one another such that each is offset from another along a longitudinal direction of the shell at a plurality of distances, wherein each of the plurality of distances is greater than the preceding distance along the longitudinal direction of the shell;

reacting the feed gas mixture in the plurality of catalytic partial oxidation reactors in the presence of an oxidation catalyst to convert the feed gas mixture to an exit gas mixture of hydrogen and carbon monoxide; and

passing a heat exchange fluid through the shell and past the plurality of catalytic partial oxidation reactors with the heat exchange fluid in the shell flowing in the same direction of reactant flow in the catalytic partial oxidation reactors disposed in the shell parallel to and spaced from one another such that each is offset from another at the plurality of distances, wherein each of the plurality of distances is greater than the preceding distance along the longitudinal direction of the shell such that heat spots in the shell are prevented and the temperature of the hydrocarbon fuel is less than about 240°C at the step of feeding when heat from partial oxidation in the plurality of catalytic partial oxidation reactors transfers from the plurality of catalytic partial oxidation reactors to the heat exchange fluid in the shell; and

transferring the heat from the heat exchange fluid exiting the shell to the hydrocarbon fuel prior to feeding the hydrocarbon fuel into the plurality of catalytic partial oxidation reactors to vaporize the hydrocarbon fuel.

8. (Original) A method as in Claim 7, wherein the hydrocarbon fuel is a heavy hydrocarbon fuel.

9. (Original) A method as in Claim 8, wherein said heavy hydrocarbon fuel comprises a plurality of hydrocarbon molecules, with substantially all of said molecules each containing at least 6 carbon atoms.

10. (Original) A method as in Claim 8, wherein said heavy hydrocarbon fuel is selected from the group consisting of gasoline, kerosene, jet fuel, and diesel fuel.

11. (Original) A method as in Claim 7, wherein said oxidation catalyst is a noble metal.

12. (Original) A method as in Claim 7, wherein the partial oxidation reaction is maintained at a temperature greater than about 900°C.

13. (Currently Amended) A method for producing electric power comprising the steps of:

feeding a feed gas mixture comprising an oxygen containing gas and a hydrocarbon fuel through a plurality of catalytic partial oxidation reactors disposed in a shell parallel to and spaced from one another such that each is offset from another along a longitudinal direction of the shell at a plurality of distances, wherein each of the plurality of distances is greater than the preceding distance along the longitudinal direction of the shell;

reacting the feed gas mixture in the plurality of catalytic partial oxidation reactors in the presence of an oxidation catalyst to convert the feed gas mixture to an exit gas mixture of hydrogen and carbon monoxide;

passing a heat exchange fluid through the shell and past the plurality of catalytic partial oxidation reactors with the heat exchange fluid in the shell flowing in the same direction of reactant flow in the catalytic partial oxidation reactors disposed in the shell parallel to and spaced from one another such that each is offset from another at the plurality of distances, wherein each of the plurality of distances is greater than the preceding distance along the longitudinal direction of the shell such that heat spots in the shell are prevented and the temperature of the hydrocarbon fuel is less than about 240°C at the step of feeding when heat from partial oxidation in the plurality of catalytic partial oxidation reactors transfers from the plurality of catalytic partial oxidation reactors to the heat exchange fluid in the shell;

directing said exit gas mixture to a solid oxide fuel cell system; and

transferring the heat from the heat exchange fluid exiting the shell to the hydrocarbon fuel prior to feeding the hydrocarbon fuel into the plurality of catalytic partial oxidation reactors to vaporize the hydrocarbon fuel.

14. (Original) A method as in Claim 13, wherein the hydrocarbon fuel is a heavy hydrocarbon fuel.

15. (Original) A method as in Claim 14, wherein said heavy hydrocarbon fuel comprises a plurality of hydrocarbon molecules, with substantially all of said molecules each containing at least 6 carbon atoms.

16. (Original) A method as in Claim 14, wherein said heavy hydrocarbon fuel is selected from the group consisting of gasoline, kerosene, jet fuel, and diesel fuel.

17. (Original) A method as in Claim 13, wherein said oxidation catalyst is a noble metal.

18. (Original) A method as in Claim 13, wherein the partial oxidation reaction is maintained at a temperature greater than about 900°C.